

Remarks/Arguments

In the Office Action dated July 10, 2008, it is noted that claims 1-19 are pending and that claims 1-19 stand rejected under 35 U.S.C. §103.

Cited Art

The following references have been cited and applied against the claims: U.S. Patent 6,037,984 to Isnardi et al. (hereinafter referenced as "*Isnardi*"), U.S. Patent 6,876,592 to Srinivasan et al. (hereinafter referenced as "*Srinivasan*"), and an article entitled, "*Digital Watermarking of MPEG-2 Coded Video In The Bitstream Domain*," by Hartung et al. listed as both *Reference AL* on Applicant's *Information Disclosure Citation (PTO Form-1449)* and *Reference U* on Examiner's *Notice of References Cited* (hereinafter referenced as "*Hartung*").

Rejection of Claims 1-2, 6, 8-10, 14, and 16-18 under 35 U.S.C. §103

Claims 1-2, 6, 8-10, 14, and 16-18 stand rejected under 35 U.S.C. §103 as being unpatentable over Isnardi in view of Srinivasan. This rejection is respectfully traversed.

Claims 1, 8, and 9 are independent base claims. Claims 2 and 6 depend directly from claim 1; and claims 10, 14, and 16-18 depend ultimately from claim 9. Claims 1, 8 and 9 include substantially similar limitations that are patentably distinguishable from the cited art. Accordingly, the remarks below will focus on claim 1, and are intended to apply uniformly to claims 8 and 9 without further express reference thereto.

The claimed invention is related to watermarking a compressed information signal. In an exemplary embodiment, the watermark information is added to the compressed information signal **only if** the addition of the watermark information increases the length of a repeating stream, thereby increasing the compression efficiency of the run-length encoding. Because conventional run-length encoders are generally optimized for encoding runs of zeros, the watermark information is preferably added **only if** the addition results in an increase in the number of zeros input to the run-length encoder. Because it is desirable that the watermark modifications produce a minimal impact on the ultimate compressed information signal, the watermark

information is added **only if** the information signal has the smallest value other than zero (e.g., a value of ± 1).

As defined in independent claim 1, the claimed subject matter comprises a method of embedding a watermark in an information signal which is compressed so as to include first signal samples having a first value and second signal samples having a second value. The method comprises the act of modifying at least one of the first and second signal samples in accordance with a watermark pattern to produce a modified signal sample, wherein the act of modifying is applied to at least one of the first and second signal samples only if the modified signal sample equals zero.

As admitted on page 3 of the present Office Action, Isnardi fails to teach modifying a signal sample in accordance with a watermark pattern ***only if*** the modified signal sample equals zero, as specifically defined in claim 1. It is said in the Office Action that Srinivasan was added to Isnardi to remedy this deficiency in Isnardi.

Isnardi appears to teach a watermarking method and apparatus designed to overcome the deficiencies in the prior art by maintaining all the elements of a watermark when combining the watermark with the information signal. *See Isnardi at col. 2, lines 9-12.* Isnardi states that he performs the watermarking without limiting the watermark signal. *See Isnardi at col. 2, lines 15-18.*

Isnardi performs his watermarking technique by masking a signal sample to be watermarked in such a way that specific coefficients in the signal sample are set to zero prior to combining these zeroed signal samples with the watermark. *See Isnardi, col. 4, lines 23-34.* The specific coefficient locations correspond to the locations where the watermark information is to be added. *See Isnardi at col. 2, lines 20-23.* In this way, the watermark coefficients unconditionally replace the selected (zeroed) signal sample coefficients corresponding to the watermark locations. *See Isnardi at col. 2, lines 23-27.* The coefficient for the watermarked signal resulting from the addition of the watermark coefficient to the signal sample (zeroed) coefficient is non-zero.

Isnardi recognizes that his technique will increase the bit count for the watermarked signal over the non-watermarked signal. *See Isnardi at col. 6, lines 11-29.* He even suggests a technique for minimizing the overall bit count increase. *See Isnardi at col. 6, lines 19-29.* But it is clear that Isnardi intends to take whatever measures are

necessary to maintain the watermark without limitation, even when that means that the bit count per watermarked block increases.

Srinivasan is similar to, and cumulative over, Isnardi in that the transform of the original signal is modified *“by replacing at least some and preferably all of the coefficients whose values are zero with corresponding nominal randomly selected non-zero values.”* See *Srinivasan at col. 14, lines 38-44*. It is at this point that Srinivasan computes a so-called “zero count” to represent the total number of zero-valued coefficients remaining in the modified signal sequence. The zero-count is an ancillary word tacked onto the modified signal.

Contrary to the assertion in the present Office Action, the zero-count ancillary code word does not perform any modification in an embedding process. It merely represents the number of zero-valued coefficients in a particular signal sequence. The embedding techniques proposed by both Srinivasan and Isnardi do not create zero-valued coefficients in a watermarked signal. They do just the opposite. That is, they create non-zero valued coefficients in the watermarked signal. The techniques proposed by Srinivasan and Isnardi change the zero-valued coefficients in the signal being marked (e.g., Isnardi’s masked signal and Srinivasan’s transformed original signal) into non-zero coefficients. The resulting coefficient values in either technique are therefore non-zero. This is an opposite result to that claimed by Applicant.

Applicant’s claims call, in part, for “the act of modifying is applied to at least one of the first and second signal samples only if the modified signal sample equals zero.” See *claim 1 above and see similarly worded limitations in claims 8 and 9 above*. Both Isnardi and Srinivasan start with a zero-valued coefficient in the signal to be watermarked and then they change that coefficient to a non-zero valued coefficient after embedding. Thus, neither Isnardi nor Srinivasan teach, show, or suggest that the embedding operation takes place on a particular coefficient if, after embedding or modification, the modified signal sample equals zero, as required by the claims.

In light of the remarks above and in view of the remarks above with respect to the similarity between the limitations in claims 8 and 9, it is believed that the claims 1, 8 and 9 and the claims dependent thereon would not have been obvious to a person of ordinary skill in the art upon a reading of Isnardi and Srinivasan, either separately or in

combination. Therefore, it is submitted that claims 1-2, 6, 8-10, 14, and 16-18 are allowable under 35 U.S.C. §103. Withdrawal of this rejection is respectfully requested.

Rejection of Claims 3-5, 7, 11-13, 15, and 19 under 35 U.S.C. §103

Claims 3-5, 7, 11-13, 15, and 19 stand rejected under 35 U.S.C. §103 as being unpatentable over Isnardi in view of Srinivasan and further in view of Hartung. This rejection is respectfully traversed.

As stated above, claims 1 and 9 are independent base claims. Claims 3-5 and 7 depend ultimately from claim 1; and claims 11-13, 15, and 19 depend ultimately from claim 9. Also as stated above, claims 1 and 9 include similar limitations that are patentably distinguishable from the cited art. Thus, the remarks below will focus on the method claim set, and are intended to apply uniformly to claim 9 and its dependent claims without further express reference thereto.

It should be noted that Hartung does not remedy the deficiencies noted above with respect to the combined teachings in Srinivasan and Isnardi. Hartung does not teach, show, or suggest that “the act of modifying is applied to at least one of the first and second signal samples only if the modified signal sample equals zero,” as defined in Applicant’s independent base claims. Therefore, the combination of Isnardi, Srinivasan, and Hartung does not teach, show, or suggest all the elements of Applicant’s claimed invention.

Moreover, the combination of Hartung with Isnardi and Srinivasan is improper. In fact, Isnardi expressly teaches away from the teachings of Hartung. *See Isnardi at col. 1, line 26 through col. 2, line 12.* Hartung is said by Isnardi to modify the DCT information signal by using less than the entire watermark. Isnardi views that as a problem and seeks to remedy that problem by not removing any portion of the watermark signal in modifying the DCT information signal. *See Isnardi at col. 2, lines 9-12.* Isnardi does not want to limit the watermark signal information in any way, even if that means that the bit count of the resulting watermarked signal is increased over the original signal. Isnardi uses the entire watermark signal, not less than the entire watermark signal. Thus, Isnardi is contrary to the teachings of Hartung and cannot be combined with Hartung. There is clearly no motivation in the references themselves to make this combination.

In light of the remarks directly above and in view of the remarks above with respect to claim 1 and the similarity between the limitations in claim 9, it is believed that the claims 3-5, 7, 11-13, 15, and 19 would not have been obvious to a person of ordinary skill in the art upon a reading of Isnardi, Srinivasan, and Hartung, either separately or in combination. Therefore, it is submitted that claims 3-5, 7, 11-13, 15, and 19 are allowable under 35 U.S.C. §103. Withdrawal of this rejection is respectfully requested.

Conclusion

In view of the foregoing, it is respectfully submitted that all the claims pending in this patent application are in condition for allowance. Reconsideration and allowance of all the claims are respectfully solicited.

In the event there are any errors with respect to the fees for this response or any other papers related to this response, the Director is hereby given permission to charge any shortages and credit any overcharges of any fees required for this submission to Deposit Account No. 14-1270.

Respectfully submitted,

/Brian S. Myers/

By: Brian S. Myers
Registration No. 46,947
Myers Wolin, LLC

For: Larry Liberchuk,
Registration No. 40,352

Mail all correspondence to:

Larry Liberchuk, Registration No. 40,352
US PHILIPS CORPORATION
P.O. Box 3001
Briarcliff Manor, NY 10510-8001

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